

We claim:

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1. An isolated nucleic acid molecule comprising a member of the group consisting of:

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(a) a nucleotide sequence that encodes a polypeptide having the amino acid sequence of FIG. 2;

(b) the complement of the nucleotide sequence of (a);

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(c) a HBMYCNG gene or a complement of a HBMYCNG gene as contained in ATCC Deposit No. \_\_\_\_\_;

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(d) an isolated nucleic acid molecule comprising nucleotides 23 to 2011 of SEQ ID NO:1, wherein said nucleotides encode a polypeptide of SEQ ID NO:2 minus the start codon;

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(e) an isolated nucleic acid molecule comprising nucleotides 20 to 2011 of SEQ ID NO:1, wherein said nucleotides encode a polypeptide of SEQ ID NO:2 including the start codon;

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(f) An isolated nucleic acid molecule comprising the nucleotide sequence of FIG. 1;

(g) A nucleic acid molecule comprising a nucleotide sequence encoding a deletion mutant of HBMYCNG or the complement of the nucleotide sequence of the deletion mutant of HBMYCNG;

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(h) a nucleic acid molecule capable of hybridizing to and which is at least 95% identical to a nucleic acid molecule of (a), (b), (c), (d), (e), (f), or (g); and

5 (i) An isolated nucleic acid molecule of (h),  
further comprising a label.

2. An isolated nucleic acid molecule comprising a  
nucleotide sequence that hybridizes to the nucleic acid  
of claim 1 and encodes a naturally occurring HBMYCNG  
10 polypeptide.

3. An isolated nucleic acid molecule of claim 2  
further comprising the nucleotide sequence linked  
uninterrupted by stop codons to a nucleotide sequence  
15 that encodes a heterologous protein or peptide.

4. A recombinant vector containing the nucleotide  
sequence of claim 1.

20 5. A genetically engineered host cell containing  
the nucleotide sequence of claim 1.

6. The genetically engineered host cell of claim 5  
containing the nucleotide sequence of claim 1 operatively  
25 associated with a regulatory nucleotide sequence  
containing transcriptional and translational regulatory  
information that controls expression of the nucleotide  
sequence in a host cell.

30 7. A method of making an HBMYCNG polypeptide  
comprising the steps of:

- (a) culturing the cell of claim 6 in an  
appropriate culture medium to produce an  
HBMYCNG polypeptide; and  
35 (b) isolating the HBMYCNG polypeptide.

8. The method of claim 7, wherein the HBMYCNG  
5 polypeptide is HBMYCNG or a functionally equivalent  
derivative thereof.

9. An antibody preparation which is specifically  
reactive with an epitope of an HBMYCNG polypeptide.

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10. A transgenic animal comprising the nucleic acid  
molecule of claim 1.

11. A substantially pure polypeptide comprising a  
15 member of the group selected from:

- (a) A substantially pure polypeptide encoded  
by the nucleic acid molecule of claim 1;
- (b) A substantially pure human polypeptide, as  
depicted in FIG. 2;
- 20 (c) A substantially pure polypeptide which is  
at least 95% identical to the polypeptide  
as set forth in FIG. 2;
- (d) A substantially pure polypeptide  
comprising amino acids 2 to 664 of SEQ ID  
25 NO:2, wherein said amino acids 2 to 664  
comprise a polypeptide of SEQ ID NO:2  
minus the start methionine; and
- (e) A substantially pure polypeptide  
comprising amino acids 1 to 664 of SEQ ID  
30 NO:2.

12. A fusion protein comprising a polypeptide of  
claim 11 and a second heterologous polypeptide.

35 13. A test kit for detecting and/or quantitating a  
wild type or mutant HBMYCNG nucleic acid molecule in a  
sample, comprising the steps of contacting the sample

with a nucleic acid molecule of claim 1; and detecting  
5 and/or quantitating the label as an indication of the  
presence or absence and/or amount of a wild type or  
mutant HBMYCNG nucleic acid.

14. A test kit for detecting and/or quantitating a  
10 wild type or mutant HBMYCNG polypeptide in a sample,  
comprising the steps of contacting the sample with the  
antibody of claim 9; and detecting and/or quantitating a  
polypeptide-antibody complex as an indication of the  
presence or absence and/or amount of a wild type or  
15 mutant HBMYCNG nucleic acid.

15. A method for identifying compounds that  
modulate HBMYCNG activity comprising:

- 20 (a) contacting a test compound to a cell that  
expresses a HBMYCNG gene;  
(b) measuring the level of HBMYCNG gene  
expression in the cell; and  
(c) comparing the level obtained in (b) with  
the HBMYCNG gene expression obtained in  
25 the absence of the compound;

such that if the level obtained in (b) differs from that  
obtained in the absence of the compound, a compound that  
modulates HBMYCNG activity is identified.

30 16. A method for identifying compounds that  
modulate HBMYCNG activity comprising:

- (a) contacting a test compound to a cell that  
contains a HBMYCNG polypeptide;  
(b) measuring the level of HBMYCNG polypeptide  
35 or activity in the cell; and  
(c) comparing the level obtained in (b) with  
the level of HBMYCNG polypeptide or

activity obtained in the absence of the  
5 compound;  
such that if the level obtained in (b) differs from that  
obtained in the absence of the compound, a compound that  
modulates HBMYCNG activity is identified.

- 10 17. A method for identifying compounds that  
regulate ion channel-related disorders, comprising:
- (a) contacting a test compound with a cell  
which expresses a nucleic acid of claim 1,  
and
  - 15 (b) determining whether the test compound  
modulates HBMYCNG activity.

18. A method for the treatment of ion  
channel-related disorders, comprising administering an  
20 effective amount of a compound that increases expression  
of a HBMYCNG gene.

19. A pharmaceutical formulation for the treatment  
of ion channel-related disorders, comprising a compound  
25 that activates or inhibits HBMYCNG activity, mixed with a  
pharmaceutically acceptable carrier.

20. A method for identifying compounds that modulate  
the activity of an ion channel comprising:
- 30 (a) contacting a test compound to a cell that  
expresses a HBMYCNG gene and the ion  
channel, and measuring Ca<sup>2+</sup> flux into the  
cell;
  - (b) contacting a test compound to a cell that  
35 expresses a HBMYCNG gene but does not  
express the ion channel, and measuring  
Ca<sup>2+</sup> flux into the cell; and

- (c) comparing Ca<sup>2+</sup> flux obtained in (b) with  
5 the Ca<sup>2+</sup> flux obtained in (a);  
such that if the level obtained in (b) differs from that  
obtained in (b), a compound that modulates ion channel  
activity is identified.
- 10 21. An isolated nucleic acid molecule consisting of  
a member of the group consisting of:
- (a) a nucleotide sequence that encodes a  
polypeptide having the amino acid sequence  
of FIG. 2;
  - 15 (b) the complement of the nucleotide sequence  
of (a);
  - (c) a HBMYCNG gene or a complement of a  
HBMYCNG gene as contained in ATCC Deposit  
No. \_\_\_\_\_;
  - 20 (d) an isolated nucleic acid molecule  
comprising nucleotides 23 to 2011 of SEQ  
ID NO:1, wherein said nucleotides encode a  
polypeptide of SEQ ID NO:2 minus the start  
codon;
  - 25 (e) an isolated nucleic acid molecule  
comprising nucleotides 20 to 2011 of SEQ  
ID NO:1, wherein said nucleotides encode a  
polypeptide of SEQ ID NO:2 including the  
start codon;
  - 30 (f) An isolated nucleic acid molecule  
comprising the nucleotide sequence of FIG.  
1;
  - (g) A nucleic acid molecule comprising a  
nucleotide sequence encoding a deletion  
35 mutant of HBMYCNG or the complement of the  
nucleotide sequence of the deletion mutant  
of HBMYCNG;

- 5 (h) a nucleic acid molecule capable of hybridizing to and which is at least 95% identical to a nucleic acid molecule of (a), (b), (c), (d), (e), (f), or (g); and
- (i) An isolated nucleic acid molecule of (h), further comprising a label.

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22. A substantially pure polypeptide consisting of a member of the group selected from:

- 15 (a) A substantially pure polypeptide encoded by the nucleic acid molecule of claim 1;
- (b) A substantially pure human polypeptide, as depicted in FIG. 2;
- (c) A substantially pure polypeptide which is at least 95% identical to the polypeptide as set forth in FIG. 2;
- 20 (d) A substantially pure polypeptide comprising amino acids 2 to 664 of SEQ ID NO:2, wherein said amino acids 2 to 664 comprise a polypeptide of SEQ ID NO:2 minus the start methionine; and
- 25 (e) A substantially pure polypeptide comprising amino acids 1 to 664 of SEQ ID NO:2.

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